

In the statistical treatment Dr. Woods first examines the interesting question of whether there is any connection between mental and moral qualities, and by means of Pearson's "fourfold-table" method finds the high value of  $0.3403 \pm 0.0419$  for the coefficient of correlation, and he then proceeds to show that the average number of adult children increases with the higher grade of morality of the parent. It is a pity that no correlation table is given in this last case, as the result is interesting. It is, of course, a conclusion that would be expected from general considerations; for the dissolute members of any community tend to die at an early age, which leads one to expect them to have few children, while the fact of their being dissolute generally means that the children born are less healthy and therefore more often die in childhood. The other statistical results can be conveniently summarised as follows :—

	Coefficients of correlation between		
	Offspring and fathers	Offspring and grandfathers	Offspring and great-grandfathers
Mental qualities	... 0.301	... 0.161	... 0.153
Moral qualities	... 0.298	... 0.175	... not calculated

The first four of these agree closely with the 0.3 and 0.15 expected by the Law of Ancestral Heredity. In comparing the figures given with those obtained from other sources it should be borne in mind that assortative mating is probably very slight among members of Royal Families, while elsewhere it plays an important part. We think it would have been well to give some information about the correlation between brothers, and also between offspring and mothers; the maternal lines have in fact been neglected almost entirely in the statistical work.

Dr. Woods states as his reason for using the "four-fold-table" method for finding coefficients of correlation, that his grades do not necessarily represent quantitative measurements, "for we do not know that grade (4) is twice as intellectual as grade (2), &c." This is incorrect; the ordinary method merely requires the groups to be equidistant, and the remarks on pp. 19 and 20 on the distributions of the people in their grades of intelligence or morality leave the impression that Dr. Woods attempted to make them so. In his correlation tables he always divides the offspring and parents into "below the mean" and "above the mean," instead of saying "grades (1) to (5)" and "grades (6) to (10)." The latter represents the real division, as the mean cannot be fixed without knowing the relative distances between the grades.

The book would be the better for a good index, and one or two misprints such as Frederick Harrison and homogamy and father for brother on p. 235 have been allowed to pass, while we think the description of the condition of Portugal during the reign of Alfonso IV. as "progress, especially against the infidels," an unhappy one.

The conclusions reached in the two books are much alike, as the authors find a few centres about which the intelligence seems to collect rather than a chance-distribution of highly intelligent individuals through the population. We cannot help feeling, however, that there is some doubt as to whether the collection of

information among special groups is as satisfactory as the investigation of random samples of the population. This objection can be urged against the "Nobility Families" rather than against the "Royalty," because in the former work we do not know for certain how many very able persons spring from the general public, but a similar question does not arise in dealing with Royalty, and the only point is how far we may apply results obtained from one class to persons in another.

We are inclined to think that both books may find readers among those who have not made a special study of the statistics bearing on heredity, for both give information in a clear and interesting manner, and the lists of families in the one case and the discussion of Royal personages in the other will attract many who would never look at a work containing nothing but statistical investigation. Is it too much to hope that some of these readers may be led to appreciate that the ultimate proof of historical or biological theories must have a statistical basis? That they will appreciate the painstaking energy of the authors is beyond doubt.

I.

#### TOPOGRAPHICAL SURVEYING.

*Text-book of Topographical and Geographical Surveying.* By Major C. F. Close, C.M.G., R.E. Pp. iv+288. Printed for H.M. Stationery Office. Price 3s. 6d.

THE art of topographical surveying was almost invariably known in this country until recent years as "military topography," a phrase which may be taken to mean not that the topography of a region presented special features to the soldier, but that little attention was paid to topographical surveying of any sort until military necessity arose. The fact that interest in and knowledge of surveying of this kind is no longer confined to the Army is largely due to the active influence of the Royal Geographical Society in London and in the Universities of Oxford and Cambridge, as a result of which an increasing number of intending travellers, explorers, naturalists, and colonists go through some training in surveying before setting out for distant parts, but it is scarcely less due to the work of the Royal Engineers in constantly developing and testing new instruments and methods in the field, and in making the results of trial and experiment generally accessible.

That the extent of the field before the topographer is great is abundantly evident from Major Close's statement in an introductory paragraph that "excluding Canada, Australia, New Zealand, and India, the total unmapped area of the British Empire amounts to about 3,700,000 square miles." Now we cannot expect that the whole of this area will be mapped for purely military purposes. It is to be hoped that sooner or later Government surveyors will lay down a primary triangulation over it for the benefit of the topographer who may follow, but we can scarcely expect more. The topographic map must in the end be made by the civilian who is to use it; the most he can look for

from outside is a number of fixed points upon which to "hang" his own surveys.

Thus we arrive at the conclusion that more provision must be made for the training of civilian topographers in this country, and we are at once confronted by great difficulties. Students learning surveying are usually studying other subjects at the same time, and in the more open parts of these islands where alone it is easy to do small-scale work extending over any considerable area, opportunities of studying other subjects are necessarily limited. The question of time also becomes troublesome, much of what is available being soon spent in getting to and from the scene of operations; and the climate, difficulties connected with trespass, setting up marks, getting unskilled assistance, and so on, are all against the student. Work with ordinary "classes" is for the most part restricted to mapping on a scale of at least three inches to a mile, with "demonstrations" of the nature of secondary triangulation, and bicycle expeditions for practice in rapid sketching over larger areas; beyond this it is necessary to depend on "vacation courses" extending over a week or ten days in the summer. The expedients, however, are more or less of the nature of makeshift, and the student cannot hope to acquire the eye for country, and the facility in representing it, which is characteristic of skilled surveyors in constant practice, like the native topographers in the survey of India.

But the difficulty does not end here, for it affects the civilian teacher as well as the student. However great the skill and experience of the latter may be, it is scarcely possible for him to keep "up to date" without direct contact with actual modern survey work, and this is difficult to achieve. The importance of this is clearly shown in Major Close's book, in which, as he says, "the field methods described are, for the most part, those in use by the Survey of India; but advantage has been taken of recent experience in mapping and exploring various territories in Africa and elsewhere to include useful methods which are not commonly employed in India."

Hence, for many reasons, it is to the advantage of all topographers in this country to keep up as close acquaintance as possible with the service work in all its branches, and amongst the many efforts which military surveyors have always made to render this easy, few have been more entirely adequate than the publication of this book. There are few subjects in which books by themselves are of less assistance than topographical surveying, but Major Close has succeeded fully in doing what can be done by this means.

The body of the book consists of seventeen chapters on instruments and methods, sketching, map projections, the reproduction of maps in the field, field astronomy and the determination of positions, and the theory of errors as applied to topographical work. Some of these chapters have been partly written by officers who have given special attention to the subjects treated of, others are drawn from published papers, and the sections on field astronomy have been revised by Mr. A. R. Hinks, of Cambridge Observa-

tory. The eighteen tables giving the quantities usually required for plotting graticules, computing astronomical results, and so on have been specially revised, and in some cases recalculated. Ten appendices give various useful lists, explanations, and formulæ. The thirty-four plates, which include admirable examples of sketch maps of different kinds, specimen sheets of British and foreign topographical maps on different scales, and four new star charts, are almost the best features of the book. It would be difficult to suggest a better exercise in map reading for the student than a study of the reproductions of maps executed by the Ordnance Survey.

Taking the book for what it is, we find, as might be expected, little or nothing to criticise; it would be easy to criticise it for what it is not, and does not profess to be. As a text-book, experience has proved its excellence, but it must be fully realised that it is true to its name, and that while it supplies the text, the teacher must preach the sermon. Many chapters are distinctly of the "penniman" order, and would prove extremely difficult to a reader altogether unacquainted with the subject. The difficulty is no doubt got over to some extent by the excellent lists of references given. These lists might perhaps be made more complete, but in some cases satisfactory books are still to be written. We may take as an example the chapter on map projections—largely reprinted from Major Close's "sketch" of the subject—and venture to express the hope that the author will one day give us an authoritative text-book on this alone. Another chapter about which the same remark might be made—indeed the author himself makes it—is that on the adjustment of errors, a subject we have always found of great value and interest even to elementary students dealing with comparatively rough observations. It is true that a good deal of help can be obtained here from the methods ordinarily employed by engineers, but for topographical purposes many useful results can be got by graphic extensions of these methods.

H. N. D.

#### GARDEN SHRIMPS.

*The British Woodlice, being a Monograph of the Terrestrial Isopod Crustacea occurring in the British Islands.* By Wilfred Mark Webb and Charles Sillem. Pp. x+54; with 25 plates and 59 figures in the text. (London: Duckworth and Co., 1906.) Price 6s. net.

AT present in England there are only two dozen species of these little land crustaceans on record. The number, combined with their love of obscurity, may remind us of the regal feast at which four-and-twenty blackbirds were served up concealed in a pastry. When the pie was opened, the birds began to sing. In correspondence with the daintiness of such a dish, the apostles of ecology are now earnestly trying to persuade society that all nature is tuneful. Those who are afflicted with toneless ears may assume a haughty indifference towards the resounding harmony, while they are themselves the objects of pity rather than of pride. The bright little volume under review